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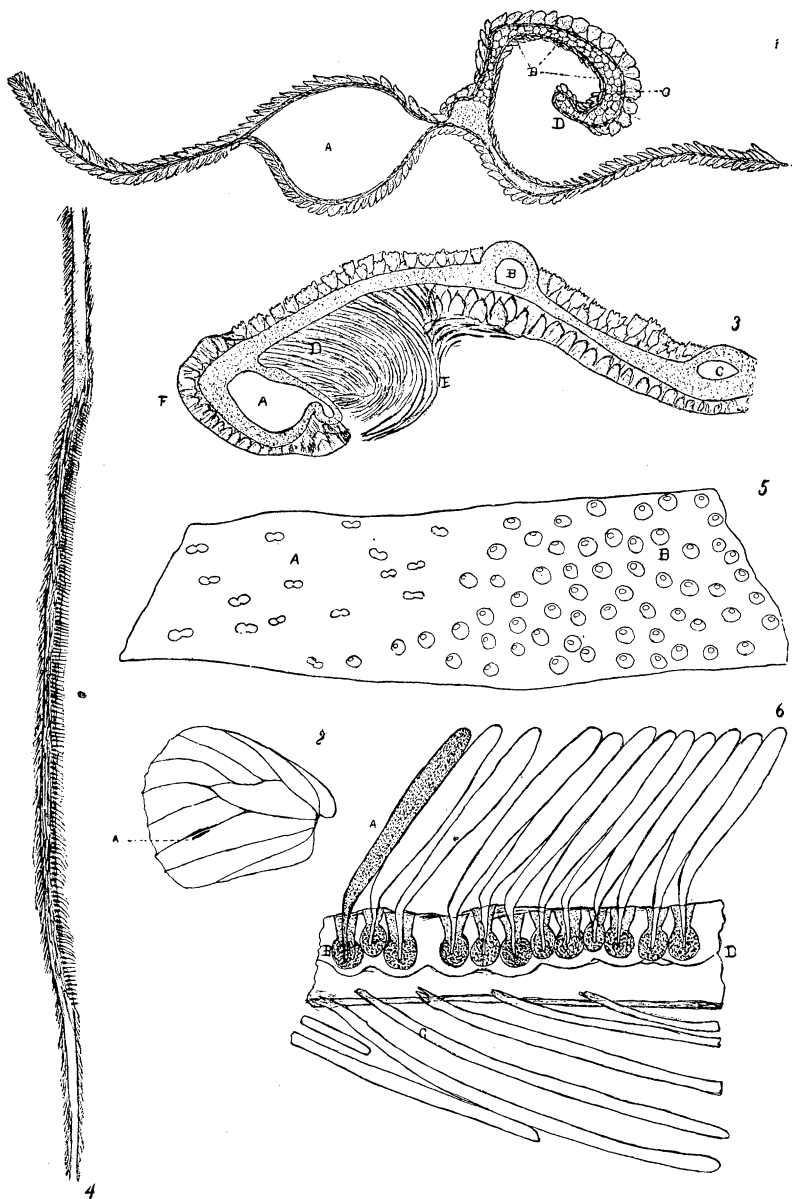
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PLATE XXII.



Androchonia of Lepidoptera.

ENTOMOLOGY.¹

The Androchonia of Lepidoptera.—In general all the scales of Lepidoptera are modified hairs and originate as papillæ-like protuberances on the surface of the wing. In structure they are at first double walled closed sacs, but soon flatten out and striæ appear; in greatest numbers on the outer surface. The arrangement on the wing may be regular or irregular. The coloring is a matter of some interest and may be due to the refraction of light on the finely ruled surface, or a pigment located between the two walls of the sac and away from direct contact with the air. But it is not the object of this paper to discuss the ordinary scales of Lepidoptera.

More than 50 years ago Bernan Deschamps observed other scales on the butterflies and from their shape called them plumules. The name was not a good one however, and has since fallen into disuse. The name androchonia was substituted and it is now the one by which the so-called scent-scales or hairs of the *male* Lepidoptera are known.

The androchonia are found in the same way as the ordinary scales, from papillæ which rise on the surface of the wing. As regards their occurrence they may be massed together in patches or scattered irregularly over the surface. If in groups they are always concealed by the large imbricated scales that seem to be congregated at that point to protect them. Often, however, they are protected by being located in a pocket or fold of some portion of the wing, as for example, in one tribe the Hesperidi, they are located underneath the reflexed margin of the fore-wings. This is their location in *Eudamus tityrus* where the marginal vein is folded back until it no longer forms the outermost edge of the wing.

In the common milk-weed butterfly (*Danais archippus*) they are located at the dark spot on the second pair of wings near the first venule of the median vein. In this case they are protected by a proliferation of the membrane of the wing which forms for them a pocket. On the second pair of wings in *Thecla calamus* they are simply collected in one region on the surface and protected by large scales which are very prominent at that point. When scattered irregularly over the wing they are always underneath the large scales and therefore well shielded.

The androchonia are very much smaller than the ordinary scales and can easily be identified. Some are black or brown but usually they are devoid of color. The color given to the patches where they occur

¹ Edited by Clarence M. Weed, Durham, N. H.

is usually due to the coloring of the large scales that are for their protection. The androchonia vary much in form, many of them being simply hair-like, others feather shaped or rod-like with a plumed tip. In structure they are much softer than the ordinary scales and consequently much more pliable, which later property serves a very efficient purpose in their concealment. There is often a canal extending from the base to the tip of the scale where it may find a direct outlet or disappear in the spongy mass found at the end of a large variety of these androchonia.

At the base of many are found the true ball and socket joints like that in the ordinary scales.

It has been shown by Weisman that the wings of the Lepidoptera do contain living tissue and this would allow the production of odors through local scent glands. This arrangement has often been conjectured but it seems that either no attempts have been made at a systematic study of the subject or the attempts have ended in failure. The trouble was no doubt due to a lack of care in the preparation of the material for study. It was found after repeated attempts that the best results were obtained by hardening the freshly removed wing in alcohol, infiltrating with collodion and preparing serial sections by the use of a microtome.

The results of careful study and repeated observations on many series of sections of various Lepidoptera has shown the androchonia to be the outlet of certain glands located in the tissue of the wing beneath the androchonia bearing surfaces. The glands in sections were very prominent and no doubt of their genuineness could be entertained. One especially prominent was found beneath the androchonia in the wing of *Danais archippus*. The character of the surface of the wing above the glands is often very interesting, it sometimes being covered with a great number of papillæ from the end of which the scent scales project; or it may be like the ordinary surface of the wing. In the former case the androchonia are quite small and but one to each papilla, at the base of which we find the gland. This gives the scent scale the appearance of a small rod placed in a flask. In the tissue of the wing we find numerous canals ramifying in various directions. The material elaborated by the local glands and distributed upon the surface of the wing by the androchonia is that which gives to many of the Lepidoptera their characteristic odor.

Müller has been able to recognize more than 30 distinct odors in different patches of these scent scales. The use of the odor is no doubt in many cases for protection, but it must also assist in sexual selection.

This study was undertaken at the suggestion of Professor J. H. Comstock, to whom I am indebted for the material examined.

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Description of Plates.

Fig. 1.—Transection of wing of *Danaïs archippus* showing the location and arrangement of the androchonia.

“ 1a.—First venule of the median vein.

“ 1b.—Androchonia bearing surface.

“ 1c.—Glands below the surface and in the tissue of the wing.

“ 1d.—The proliferation of the wing for protecting the surface.

Fig. 2.—Hind wing of male *Danaïs archippus*.

“ 2a.—Location of androchonia (nat. size).

Fig. 3.—Transection through the marginal vein of the fore-wing of *Eudamus tityrus* showing location of androchonia in the pocket formed by folding over the marginal vein.

“ 3a.—Marginal vein.

“ 3b and c.—Other veins.

“ 3d.—Location of androchonia.

“ 3e.—Large scales on the wing that protect the androchonia.

“ 3f.—Edge of the wing.

Fig. 4.—Transection of the hind wing of *Thecla calamus* at the place where the androchonia are congregated.

Fig. 5.—View of surface of the wing of *Thecla calamus* giving the arrangement and abundance of the scent scales as compared with the ordinary one. (6) Androchonia.

“ 5a.—Ordinary scales.

Fig. 6.—Trans. of wing androchonia surface on the wing of *Thecla calamus*.

“ 6a.—Androchonia.

“ 6b.—Glands at the base.

“ 6c.—Ordinary scales.

“ 6d.—Wing in section.

Fig. 7.—Trans. of wing of *Thecla calamus*, showing the androchonia with large gland at base.

“ 7a.—Androchonia.

“ 7b.—Surface of wing.

“ 7c.—Tissue of wing.

Fig. 8.—Gland.

Fig. 9.—Androchonia.

Figs. 10 and 11.—Androchonia in trans-and longisection.

Figs. 12-21.—Various kinds of androchonia and scales, showing relative sizes.

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Fleshy Cecidomyiid Twig Gall on *Atriplex canescens*.—

Numerous fleshy tumor-like twig gall, were found on *Atriplex canescens*, May 13, 1892, on mesa back of college grounds, near Las Cruces, New Mexico. One gall that was opened disclosed two cecidomyiid pupæ in separate cells within. This gall, with its occupants, was placed in alcohol. Other galls were pinned and allowed to dry. The latter, on being opened nearly a year later, disclosed a cecidomyiid larva, several cast pupal skins, and in one cell a transformed hymenopterous parasite. From the alcohol gall the following description is drawn.

Gall.—Length, 12 mm.; width, $4\frac{1}{2}$ to $6\frac{1}{2}$ mm. Rather oblong, more or less irregular in shape, fleshy when green, tumor-like, formed on one side of twig, which is itself involved in the gall. Pale greenish in color, sometimes more or less reddish as noticed in the dried galls. Outer skin of gall smooth. Two cavities inside, each about 2 by 3 mm. in diameter.

One specimen. This cecid may be called *Cecidomyia atriplicis*.

The dried galls show the twig plainly, not involved in the gall. They are red to greenish in color, surface naturally wrinkled and somewhat roughened, with sections of the thin bark of the twig showing upon the surface, but I am inclined to consider them the same as the above. This opinion is induced by the similar character of the occupants. The cells also are similar in size and shape, several in each gall according to size of latter. Some of the smaller dried galls are more rounded in shape.—C. H. TYLER TOWNSEND.

Trichodactylus xylocopæ in California.—Some little time ago I received from Mr. D. W. Coquillett, Los Angeles, California, an inter-

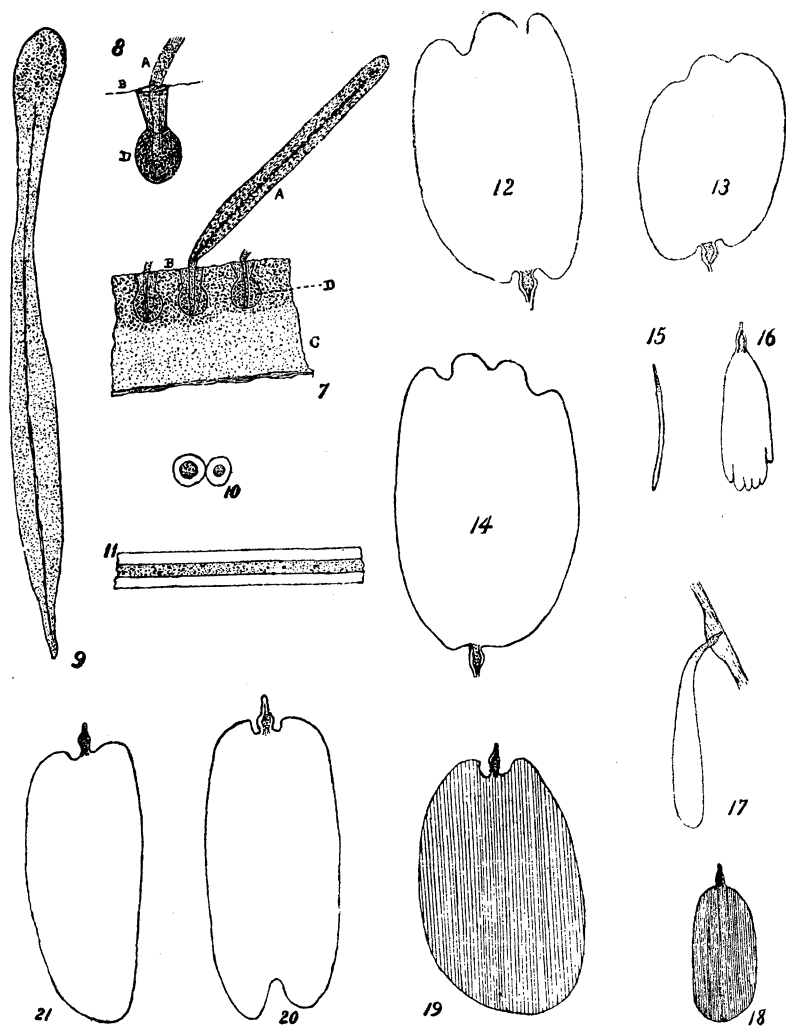
esting parasite of *Xylocopa*, and which proved on examination to be *Trichodactylus xylocopæ*.

As I know of no previous record of this Acarid, or any in this genus, being recognized in America, it seems worth while to mention it in the *Naturalist*. The specimens were taken from a Carpenter Bee and mounted in balsam by Mr. B. W. Griffith. The bee Mr. Coquillett says agrees with specimens named for him by Prof. Riley as *Hylocopa æneipennis*.

Doubtless this parasite could be found on *Xylocopa* in other localities and related species on *Osmia* and other related bees.

HERBERT OSBORN.

PLATE XXIII.



Androchonia of Lepidoptera.